

NOTES ON THE NATIVE FLORA OF NEW SOUTH WALES.

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PART II. WESTERN SLOPES OF NEW ENGLAND.

(Plates xxii., xxiv., and xxv.)

When passing through Narrabri and Moree to Inverell and Tingha in October, 1903, notes were kept of the conspicuous members of the flora distributed over these districts. These notes have since been amplified from the examination of specimens collected in the last-named localities, and are now made available as a contribution to the botanical survey of this State. The notes referring to the country extending from Boggabri to Warialda were taken from the train, consequently only the larger and well known trees are mentioned, and it must not be inferred that any particular species is absent from the district though unnoticed by me. This portion of the area traversed consists for the most part of black soil plains, luxuriant with the flowers of herbs and grasses in a good season, but one long stretch of bare ground, often dust, during a drought. Without having had some experience of areas such as our western and north-western plains, no one can conceive what great quantities of charming blooms are produced under favourable circumstances, or what desolation exists when the conditions are reversed.

From Boggabri to Narrabri is a distance north-westerly of 33 miles, the elevation above sea-level being 823 feet at the former and about 700 feet at the latter place. The following Eucalypts were noticed near the railway line:—*E. populifolia*, Hook. (Bimble or Shiny-leaved Box), *E. melanophloia*, F.v.M. (Silver-leaved Ironbark), *E. Woollsiana*, R. T. Baker (Narrow-leaved Box), *E. tereticornis*, Sm., var. *dealbata*, Deane & Maiden (Gum), *E.*

*crebra*, F.v.M. (Narrow-leaved Ironbark), *E. trachyphloia*, F.v.M. (Bloodwood), and *E. rostrata*, Schl. (River Red Gum), the latter being seen along the banks of the Namoi River near Narrabri.

The Bloodwood trees were noticed on sandstone formation between Turrawan and Tibberena, but the species could not be identified with certainty from the train, and may possibly be *E. corymbosa*, Sm., though as the first of these has already been recorded from Narrabri, and also occurs near Coonabarabran, it seems probable the tree referred to above is *E. trachyphloia*. This area of sandstone came rather as a surprise in the locality, and was made further interesting by the fact that on it was growing a quantity of *Angophora lanceolata*, Cav., the smooth-barked Apple, or so-called Red Gum of the Sydney district, the latter name being adopted because of the reddish exudation which commonly stains the otherwise dull whitish bark. The occurrence of the species in this and other isolated spots so far west is marked evidence that the geological formation at times undoubtedly affects the distribution of species. The home of this tree is on the Hawkesbury and Permo-Carboniferous sandstones around Sydney and Newcastle, but it occurs in various localities, though usually on similar formations, to the north and north-west.

Among other trees and large shrubs noticed between Boggabri and Narrabri were: *Callitris robusta*, R.Br. (White or Cypress Pine), *C. calcarata*, R.Br. (Green or Black Pine), *Dodonæa* sp., *Eremophila Mitchelli*, Benth. (Sandalwood or Budtha), *Cassia* sp., *Casuarina Cambagei*, R. T. Baker (Belah), *C. Luehmanni*, Baker (Bull Oak), *C. Cunninghamiana*, Miq. (River Oak), *Geijera parviflora*, Lindl. (Wilga), *Heterodendron oleacefolium*, Desf. (Rosewood, a very hard timber), *Acacia harpophylla*, F.v.M. (Brigalow), *A. homalophylla*, A. Cunn. (Yarran), *Canthium oleifolium*, Hook. (Wild Lemon), *Exocarpus cupressiformis*, Labill. (the so-called Native Cherry), *Xanthorrhœa* sp. (Grass Tree), and *Santalum lanceolatum*, R.Br.

The only trees seen of *Casuarina Cunninghamiana*, the River Oak, were growing along the banks of the Namoi at Narrabri,

and it would be interesting to know how far they continue down the river, as although this species is common on the higher parts of our large streams, it gradually disappears as the western levels are reached.

*Callitris calcarata*, the Black or Green Pine, so called from the colour of the bark and foliage respectively, was noticed only on the sandstone area previously mentioned. This species is generally found occupying elevated land, often somewhat rocky ridges, and it is not usually found on the low land with *C. robusta*, the White Pine.

In writing of these two species (Lectures on the Vegetable Kingdom, p.73), the Rev. Dr. Woolls says:—"These fine trees differ in habit, for whilst the black pine has a pyramidal appearance, branches somewhat upright, and branchlets rather close, the white pine is a larger tree, with a lighter bark and branches deflected, and turning up again from their ends," (Pls.xxiv.-xxv.).

Between Narrabri and Moree the following Eucalypts were passed:—*E. rostrata*, *E. tessellaris*, F.v.M. (Moreton Bay Ash or Carbeen), *E. Woollsiana*, *E. populifolia*, *E. melanophloia*, and a few trees near Tycannah of what appeared to be *E. largiflorens*, F.v.M. (River Box), but their identification is doubtful.

*E. Woollsiana* was not seen during the last 40 miles, or scarcely north of Edgeroi, but although it grows on flat land it is not a typical tree on any of the black soil plains. It was noted again, however, at about 15 miles east of Moree. In different localities its leaves were noticed to be remarkably narrow.

It may be observed that the species of Eucalyptus are not numerous between Narrabri and Moree, and although these places are sixty miles apart the intervening country is really one vast plain, long stretches at intervals being naturally destitute of trees of any description. The difference in levels between the two railway stations is only 11 feet, while the highest point between them is about 100 feet above the terminals.

Other trees and shrubs observed between these towns were:—*Argemone mexicana* (an introduced rather pretty flowering, so-

called thistle or Mexican Poppy), *Capparis Mitchelli*, Lindl. (Wild Orange), *Apophyllum anomalum*, F.v.M. (Currant, Emu, or Warrior-bush), *Pittosporum phillyræoides*, DC., *Lavatera* sp. (Mallow), *Sterculia diversifolia*, G. Don (Currajong), *Geijera parviflora*, *Ventilago viminalis*, Hook. (Supple Jack, seen only near Tycannah and east of Moree), *Atalaya hemiglauca*, F.v.M. (Whitewood, seen only near Tycannah), *Heterodendron oleaceifolium*, *Dodonæa* sp., *Swainsona* sp., *Acacia pendula*, A. Cunn. (Myall), *A. harpophylla*, *A. Oswaldi*, F.v.M., *A. stenophylla*, A. Cunn. (with very long narrow leaves, and growing along the banks of streams), *Angophora intermedia*, DC. (Apple Tree, seen only near Narrabri), *Loranthus* sp. (growing on *Acacia pendula*), *Canthium oleifolium*, *Helipterum anthemoides*, DC., *Alstonia stricta*, F.v.M. (Quinine or Bitter Bark), *Lyonsia* sp., *Eremophila Mitchelli*, *Grevillea striata*, R.Br. (Beefwood), *Casuarina Luehmanni*, *C. Cambagei*, *Santalum lanceolatum* (?), *Exocarpus aphylla*, R.Br. (?), and *Callitris robusta*.

*Grevillea striata* is the well-known Beefwood of the Upper Darling country, and is distinct from the Beefwood (*Stenocarpus salignus*, R.Br.) of the coastal area, though both belong to the same natural order, viz., Proteaceæ. A peculiarity of this order, though not actually confined to it, is that many of its genera produce plants with conspicuous medullary rays in the wood. In both the coastal and interior Beefwoods this feature is pronounced, giving to the timber a very pretty grain, and it is this streaked marking, together with the colour of the wood, that has suggested the vernacular name in each case. In the north-western districts the timber of *Hakea leucoptera*, R.Br. (Needlewood), is very similar in appearance to that of *Grevillea striata*, and when the bark (which would afford a ready means of identification) is removed from billets cut from trees of equal size, it is a matter of extreme difficulty from observation alone to separate the species.

The genus *Grevillea*, though numerically rich in species, is usually represented by shrubs, but *G. striata* is one of the exceptions, and in New South Wales is commonly a tree from 30 to

40 feet high and one foot in diameter. The timber of this species is easily split, and in the Bourke district is used for fence posts. It is a favourite with surveyors' axemen in the back country, being used for corner pegs, as it lasts very well in the ground. The tree is easily recognised by its long pendulous narrow leaves, often a foot in length, and its rough furrowed bark. In its young stage it throws out branches freely, but many of the lower ones apparently die off, as old trees are generally found with bare stems. This species is recorded from places throughout the extreme length of Queensland, and is distributed all over the north-western portion of this State. Mr. W. M. Thomas, L.S., informs me that the aboriginal name for this species on the Macquarie is Mombra.

From Moree to Warialda is a distance easterly of about 50 miles. After passing Yagobie at about half-way, where the elevation above sea-level is about 800 feet, the plains are left behind, and the country gradually rises till at Warialda the elevation is 1230 feet. Chiefly owing to this change in altitude, and, in this locality, its attendant increased rainfall, and partly to that of the geological formation, the flora of Moree is distinct from that of Warialda, although many western plants are found at the latter place, but the difference becomes more marked as the hills to the eastward are ascended. East of Hadleigh, between Yagobie and Warialda, the country is considerably cleared, and the forest has given place to wheat fields.

The Eucalypts noticed along this part of the railway line were:—*E. populifolia*, *E. melanophloia*, *E. rostrata*, *E. Woollsiana*, *E. tessellaris*, and *E. melliadora*, A. Cunn.

*E. tessellaris* is chiefly a Queensland species with roughish tessellated bark on the lower part of its trunk, the upper part and branches being clean and smooth. It was first noticed near Narrabri, and was not seen east of Yagobie, at which place the change in the flora begins to be noticeable.

*E. melliadora*, the Yellow Box or Yellow Jacket, first appeared on the flats close to Warialda. It may be mentioned that this species apparently does not frequent the black soil plains in the

west and north of this State, excepting near the rivers, but it continues along the higher country into Queensland, and in the south spreads across through Victoria. Several trees were seen near Warialda which much resembled *E. hemiphloia*, F.v.M., var. *albans*, the White Box, and the climatic conditions are favourable in this locality to their growth, but from the train their identification could not be decided with certainty.

*E. melanophloia* is very common east of Yagobie, its silvery leaves being conspicuous over the hillsides in every direction. Ghinghit is the aboriginal name for this tree on the Macquarie, according to Mr. W. M. Thomas.

*E. microtheca*, F.v.M., the Coolabah of the Darling River north of Bourke, was not identified within the area under discussion, and its absence seemed remarkable over the very similar country around Moree. It has, however, been recorded by Mr. Baker from near Narrabri (these Proceedings, 1902, p.226).

*Angophora intermedia* grows on the flats near Warialda, and on a sandstone hill to the eastward is *A. lanceolata* also.

Other trees and small plants identified between Moree and Warialda were:—*Argemone mexicana*, *Capparis Mitchelli*, *Apophyllum anomalum*, *Sterculia diversifolia*, *Geijera parviflora*, *Ventilago viminalis*, *Heterodendron oleæfolium*, *Dodonæa* sp. (Hopbush), *Swainsona* sp., *Acacia excelsa*, Benth. (Ironwood, only seen near Moree), *A. harpophylla*, *A. pendula*, *A. Oswaldi*, *Canthium oleifolium*, *Helipterum anthemoides*, *H. polyphyllum*, F.v.M., *Senecio lautus*, Forst., *Wahlenbergia gracilis*, DC. (Blue Bell), *Lyonsia* sp., *Solanum* sp., *Eremophila Mitchelli*, *Grevillea striata* (only near Moree), *Casuarina Cambagei*, *C. Luehmanni*, and *Callitris robusta*.

*Casuarina Luehmanni*, Bull Oak, was not noticed east of Yagobie, but it has since been collected near Emmaville by Mr. E. C. Andrews.

It was noticed that *Acacia homalophylla* (Yarran) was not seen much north of Boggabri, and it is concluded therefore that the species becomes rare towards that portion of the north of this State, which lies immediately west of New England, though in

the central and southern parts of the western area it is very common.

*Acacia Cambagei*, R. T. Baker, (the Gidgea of the Bourke district), was not seen at all, even the country around Moree evidently being too far east for the species, though it is known to continue northward from Bourke well into Queensland.

*A. aneura*, F.v.M. (Mulga), *Flindersia maculosa*, F.v.M. (Leopardwood), and *Hakea leucoptera*, R.Br. (Needlewood), were not observed on any part of the journey, and although the latter might easily escape notice, the former two usually grow in large clumps and are readily recognised, so that they are undoubtedly rare in the district described.

Another feature of the landscape, as compared with the western and south-western areas, was the absence of every species of Mallee; but although these stunted forms of Eucalyptus are common in the west, they do not usually occur on the black soil plains, which are in reality old flood plains, but either on slight elevations or levels formed by gradual erosion of earlier formations.

*Acacia harpophylla* (Brigalow) is very common, and in places east of Moree forms large scrubs in company with *Casuarina Cambagei* (Belah). Owing to its long sickle-shaped silvery leaves, which suggested its botanical name, it is a very conspicuous tree about the plains and easily recognised. It was noticed that in many places it grew perfectly straight to a height of perhaps 40 or 50 feet, the branchless bole, covered with a fairly rough bark, maintaining much the same size for a considerable distance and rarely exceeding one foot in diameter. It would again be seen assuming quite a different form, the stem throwing out branches almost from the ground, thus giving the tree a dome-shaped appearance, and imparting a very pleasing effect to the landscape. It is well known that this straight or spreading habit in our trees is regulated by the surroundings. Where seedlings grow up in thick clusters or are well protected by adjacent vegetation, as in the thick pine scrubs of the interior, or the brushes and gullies along the coastal area, the result is elongated straight

stems, while those growing in the open are more spreading and not so tall. A further feature observed was that an old Brigalow tree would often be surrounded by a cluster of smaller ones which had the appearance of seedlings, though some may possibly have been suckers, the groups having quite a homely significance. Brigalow is common in Queensland, and as well as crossing the Liverpool Range to the Upper Hunter, extends south-westerly from Narrabri past Coonamble to the Nyngan and Cobar district, where it becomes rare and occurs only in small patches, while an isolated clump south of the Lachlan River near Marsden marks the most southern point recorded for the species (*vide* these Proceedings, 1901, p.696).

Just to the east of Warialda the country rises fast, the formation being sandstone, in places forming slight escarpments. Darkness, however, soon terminated further observation, but during the few miles travelled in daylight the following trees and shrubs were noted:—*Eucalyptus melliodora*, *E. melanophloia*, *E. tereticornis*, Sm. (Forest Red Gum), *E. hemiphloia* var. *albens* (?), *E. sideroxylon*, A. Cunn. (?) (Ironbark), *Angophora intermedia*, *A. lanceolata*, *Callitris robusta*, *C. calcarata*, *Dodonæa* sp., *Lyonsia* sp., *Swainsona* sp., *Jacksonia scoparia*, R.Br. (Dogwood), *Hibbertia* sp., *Xanthorrhæa* sp., and *Brachyloma* sp.

Inverell is situated 47 miles by rail easterly from Warialda, between which places there is a break in the continuity of these notes owing to the greater part of this road having been travelled in darkness. The next tract of country to be discussed is that extending from Inverell to Tingha, which is situated on what may be termed the western margin of New England. Tingha, which lies 16 miles south-easterly from Inverell, is about 2600 feet above sea-level, the elevation of Inverell railway station being 1912 feet, though surrounding hills exceed 2000 feet. From the notes which follow it may be seen that a very great difference exists between the flora of this elevated country and that of the lower levels to the westward.

On the roadside going to Tingha the following Eucalypts were passed:—*E. melliodora*, *E. viminalis*, Labill. (White Gum, along



the flats near Inverell), *E. tereticornis*, *E. hemiphloia* var. *albena* (White Box), *E. Bridgesiana*, R. T. Baker (White Peppermint of New England, and one of the trees identified by Baron von Mueller as *E. Stuartiana*, F.v.M.), *E. macrorrhyncha*, F.v.M. (Red Stringybark), *E. sideroxylon*, A. Cunn. (Ironbark), *E. eugenioides*, Sieb. (White Stringybark), and a species not then identified, but locally known as Blackbutt.

The following plants were collected around Tingha at an average elevation of about 2800 feet above sea-level, chiefly on granite formation, and for the most part in a northerly direction towards Ponds Creek:—

RANUNCULACEÆ: *Clematis glycinoides*, DC.—DILLENIACEÆ: *Hibbertia stricta*, R.Br., *H. acicularis*, F.v.M., *H. linearis*, R.Br.—VIOLARIÆ: *Viola betonicæfolia*, Sm., *Ionidium filiforme*, F.v.M.—PITTOSPOREÆ: *Bursaria spinosa*, Cav., *Marianthus procumbens*, Benth., *Billardiera scandens*, Sm.—CARYOPHYLLÆ: *Stellaria palustris*, Retz.—RUTACEÆ: *Correa speciosa*, Andr.—STACKHOUSIÆ: *Stackhousia linarifolia*, A. Cunn.—RHAMNÆ: *Cryptandra amara*, Sm., var. *longiflora*, F.v.M. (a very attractive flower), *Discaria australis*, Hk. (a plant covered with sharp spines and bearing flowers with a somewhat strong sickly perfume).—SAPINDACEÆ: *Dodonæa viscosa*, L. (one of the plants known as Hopbush).—LEGUMINOSÆ: (Suborder i. Papilionaceæ). *Gompholobium grandiflorum*, Sm., *Daviesia corymbosa*, Sm. (a form with purely racemose inflorescence, and sometimes known as Hopbush), *D. acicularis*, Sm. *D. genistifolia*, A. Cunn., *Aotus villosa*, Sm., *Dillwynia ericifolia*, Sm., *Bossiaea prostrata*, R.Br., *Hovea linearis*, R.Br., *H. longifolia*, R.Br., *Indigofera australis*, Willd., *Swainsona* sp., *Glycine sericea*, Benth., *Hardenbergia* (*Kennedy*) *monophylla*, Benth. (False Sarsaparilla): (Suborder iii. Mimoseæ). *Acacia undulifolia*, Fraser (north-east of Inverell-Tingha road near 10-mile post), *A. obtusata* (?), Sieb., on red hill about 3 miles north of Tingha), *A. viscidula*, A. Cunn. (on Inverell road), *A. venulosa*, Benth. (north-east of 10-mile post Inverell-Tingha road), *A. implexa*, Benth. (on red hill 3 miles north of Tingha), *A. spectabilis*, A. Cunn. (east of Tingha), *A. dealbata*, Link (Silver

Wattle), *A. leptoclada* A. Cunn. (small "Wattle" with yellowish-green foliage somewhat resembling that of *A. pubescens*, R.Br., which grows on the Wianamatta Shale formation around Parramatta; found north-east of 10-mile post, and at creek near 13-mile post Inverell-Tingha road).—DROSERACEÆ: *Drosera* sp.—MYRTACEÆ: *Bæckea* sp., *Leptospermum flavescens*, Sm., *L. scoparium*, Forst. (Tea Tree, with sharp pointed leaves), *L. attenuatum* (?), Sm.,\* *Kunzea parviflora*, Schl., *Angophora subvelutina*, F.v.M. (Apple), *A. intermedia* (Apple), *Eucalyptus macrorrhyncha*, *E. melliodora*, *E. tereticornis* and a variety near *brevifolia*, *E. Bridgesiana*, *E. eugenioides*, *E. sideroxyton*, *E. conica*, Deane and Maiden, and the new species locally known as Blackbutt.—LORANTHACEÆ: *Loranthus* sp.—RUBIACEÆ: *Asperula oligantha*, F.v.M.—COMPOSITÆ: *Olearia ramulosa*, Labill., *Brachycome* sp., *Craspedia Richea*, Cass.—CAMPANULACEÆ: *Wahlenbergia gracilis* DC. (Blue Bells).—EPACRIDÆ: *Melichrus rotatus*, R.Br., *Brachyloma daphnoides*, Benth., *Lissanthe strigosa*, R.Br., *Leucopogon melaleucoides*, A. Cunn., *L. muticus*, R.Br., *Epacris microphylla*, R.Br.—SCROPHULARINEÆ: *Veronica Derwentia*, Andr.—LABIATÆ: *Ajuga australis*, R.Br.—PROTEACEÆ: *Isopogon petiolaris*, A. Cunn. (about 8 inches high, near Ponds Creek), *Persoonia cornifolia*, A. Cunn., *P. Mitchelli*, Meissn., *Grevillea floribunda*, R.Br., *Hakea microcarpa*, R.Br. (plentiful), *Lomatia silaifolia*, R.Br.—THYMELEÆ: *Pimelea glauca*, R.Br., *P. collina*, R.Br.—URTICEÆ: *Urtica incisa*, Poir.—CASUARINEÆ: *Casuarina suberosa*, Ott. & Dietr. (Forest Oak), *C. Cunninghamiana*, Miq. (on banks of river at Inverell).—SANTALACEÆ: *Exocarpus cupressiformis*, Labill.—CONIFERÆ: *Callitris calcarata*, R.Br.—CYCADEÆ: *Macrozamia secunda*, C. Moore (near Ponds Creek).—ORCHIDÆ: *Calochilus* sp., *Diuris aura*, Sm., *D. elongata*, Swartz, *Pterostylis mutica*, R.Br., *Caladenia carnea*, R.Br.—LILIACEÆ: *Burchardia*

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\* In the absence of full material, the identification of *L. attenuatum* is not satisfactory. Around Sydney and on the Blue Mountains this species has a loose brown flaky bark, but the Tingha plant has firm grey bark somewhat similar to that of *L. flavescens*.

*umbellata*, R.Br., *Stypandra glauca*, R.Br., *Arthropodium paniculatum*, R.Br.

An interesting Eucalypt was found between Inverell and Tingha, first between the 6- and 7-mile posts, and again between the 9- and 10-, extending easterly from the latter point. It has since been described by Mr. J. H. Maiden under the name of *E. Andrewsii* (these Proceedings, 1904, p.472). This tree certainly belongs to the Peppermint group, although the local name is Blackbutt, but this is partly accounted for by the fact that the former name is otherwise employed in New England, *E. Bridgesiana* being known as White Peppermint, and *E. nova-anglica*, Deane & Maiden, as Red or Black Peppermint, while the coast Blackbutt, *E. pilularis*, Sm., does not grow near Tingha, thereby leaving that name available. In general appearance *E. Andrewsii* presents considerable similarity to *E. piperita*, Sm., the Peppermint which is common around Sydney, but the fruits of the two species are quite dissimilar, those of the former approaching very nearly to the medium-sized form of *E. hæmastoma*, Sm., the White or Brittle Gum, which it may be mentioned was not seen on the area described in this paper. The "sucker" foliage is scarcely ever opposite, passing at once into the alternate stage, a feature which clearly separates the species from such Peppermints as *E. amagdalina*, Labill., and *E. dives*, Schau., to which trees there is otherwise some resemblance.

The seedling plants are erect, having fairly large bluish-grey leaves, soon alternate, and in general habit and appearance showing considerable likeness to seedlings of *E. delegatensis*, R. T. Baker, (the Mountain Ash of Tumbarumba) on a small scale.

The species was noticed at several points between Tingha and Guyra, and occurs in many localities on New England.

*E. sideroxylon*, A. Cunn., (the Mugga of the western districts) was noticed between the 11- and 12-mile posts on the Inverell-Tingha road at an altitude above sea-level of about 2700 feet. South of the Macquarie I have never found this tree at an elevation exceeding 2000 feet and usually below 1200 feet, but the influence of northern latitudes is evident in the present instance.

This species extends throughout the whole length of this State, and in coming southwards from the northern end of New England climatic influences soon drive it on to the western slopes, and before reaching the Lachlan it has spread westerly to Nymagee and Mount Hope, continuing southwards at least to Chiltern in Victoria. Just south of New England, however, where the Liverpool Range is lower than most parts of the Great Dividing Range, it apparently crosses to the eastern slopes and continues southerly, though sparingly, along the greater part of the south coast. The question whether the depression at the Liverpool Range wholly accounts for the occurrence of this species on both sides of the Great Dividing Range, or whether it may not have extended over a more general level between east and west prior to uplifts in late Tertiary times, requires investigation from a geological as well as a botanical standpoint.

There are few western Eucalypts which show a more decided preference for sedimentary formations than this Ironbark. West of the Dividing Range it usually occupies the Silurian and sometimes the Devonian areas, while on the eastern side it seems to be just as happily placed on the newer sedimentary formations such as Permo-Carboniferous, and the Wianamatta Shales of the Triassic, though so far as my observations go it does not favour the Hawkesbury Sandstone of the latter period. Although it usually avoids all igneous rocks, especially basalt, there are exceptions to this rule, as for instance at Wyalong and south-westerly from Dubbo, where it is found on decomposed granite formation. Doubtless there are other instances of its growth on various types of igneous rock, though probably plutonic.

Both the coastal and interior trees have the characteristic black deeply furrowed bark and red timber, but the former often has red flowers, that being the colour of the filaments, while those of the latter are generally creamy-white, the red-flowering tree, according to my observations, being more uncommon in the west.

*Eucalyptus conica*, Deane & Maiden, a Box tree, was found half-a-mile south-westerly from Tingha at an altitude above sea-

level of about 2700 feet. This tree had been carefully looked for near Narrabri, Moree, and towards Warialda, as those places approximate the altitudes at which it is usually found in the Macquarie to Lachlan districts. It was not noticed, however, but may occur between Warialda and Inverell.

This species is exceedingly interesting as indicating the effect of climatic influence in regulating its habitat. In the Lachlan country it is usually found below an elevation of 1100 feet above sea-level, a common altitude being about 800 feet. Near Attunga, north of Tamworth, it may be seen at about 1400 feet, while at Tingha, considerably to the north, it is growing at 2700 feet. It also occurs at much the same altitude around Bolivia, and is recorded by Maiden and Betcher from Wallangarra, near the Queensland border, which is slightly higher. It will thus be seen that this species, which occurs so far south as the Murrumbidgee district, is in its northerly course driven easterly on to higher levels as though trying to find an even temperature. In the reverse manner, there are species such as *E. macrorrhyncha* and *E. Cambagei* around Orange which push out much to the westward, and will grow on lower levels as they proceed southerly towards Albury.

A close study of the feature reveals many interesting points, of which the following is an example. *Elæodendron australe*, F.v.M., and *Alphitonia excelsa*, Reiss. (Red Ash), are both found on the coast south of Sydney, continuing northwards, and are associated with what is known as brush or jungle, though perhaps not in its thickest form. In going northerly it is found that at Tamworth the latter has already crossed the Main Divide at the Liverpool Range, and may be found at an altitude of about 1800 feet. On the other hand, *Acacia harpophylla*, F.v.M., (Brigalow) belongs to the interior of this State, and grows in country the exact antithesis of Illawarra, but it comes easterly as northern latitudes are approached until in Queensland, as recorded by the Rev. J. E. Tenison Woods, all these three species associate, and may be found growing in the Brigalow scrubs (these Proceedings, 1882, pp.139 and 146).

In connection with this matter, the effect of the Great Dividing Range is evident, this forming, especially towards the south, a cold barrier between the eastern and western floras, but it is interesting to note that these floras mingle on the highlands towards Queensland, where the heat of the northern latitudes is tempered by the increased elevation over coastal and western areas.

Owing to this influence, *Eucalyptus melanophloia* (the Silver-leaved Ironbark), whose most southern locality known to me is near Narromine, finds its way past Bingara and Warialda right across the tableland on to the Upper Clarence, as well as extending into Queensland.

These examples will be sufficient to show that it would be instructive to select any typical northern tree and study it throughout its southerly extension, especially with a view to noting any variation that might take place throughout its range.

Our ornithologists and ichthyologists would also find an interest in this feature, as I have seen several of the western birds on the Upper Clarence nearly 20 years ago, and before the influence of civilization and drought had disturbed them, among others being the black and white butcher bird, *Cracticus nigrigularis*, Gould. There is also a fish in the upper Clarence and Richmond waters which appears to be identical with the Murray Cod (*Oligorus* sp.), and which does not, so far as I know, occur in any coastal rivers south of the Clarence.

*Sterculia diversifolia*, G. Don, the Currajong, so well known as a fodder tree, was not noticed between Inverell, Tingha and Guyra, so is evidently scarce in the locality. This is probably owing to the altitude of those places, as the Currajong thrives better at levels below 2000 feet.

From Tingha to Guyra is a distance south-easterly of 40 miles, the country rising from about 2600 feet to 4300 feet above sea-level. The intervening country is chiefly made up of granite and basalt, the latter in many cases forming part of the high tableland, and not being too prolific in botanical specimens. The mile-posts mentioned for purposes of reference start from Inverell, number 16 being at Tingha.

After passing the 20-mile post, from which point onwards the elevation exceeds 3000 feet, the following Eucalypts were noticed: *E. tereticornis*, *E. macrorrhyncha*, *E. Bridgesiana*, *E. melliodora*, and *E. Andrewsii*, all before the 21-mile post was reached, the latter occurring again near the 34- and 38-mile posts. On the basaltic formation near the 25-mile post, *E. viminalis* appears and continues the whole way to Guyra.

In the vicinity of the 36-mile post three fresh Eucalypts are seen, viz., *E. coriacea*, A. Cunn., White Gum or White Ash, *E. stellulata*, Sieb., Black Sally or Black Ash, and *E. nova-anglica*, Deane & Maiden, Red or Black Peppermint, all of which are typical of the high country and continue right to Guyra.

Between the 41- and 42-mile posts, *E. eugenoides*, Sieb., White Stringybark, is passed, the elevation being about 3800 feet above sea-level. This species is not plentiful along this road.

Near the 50-mile post and at intervals onwards towards Guyra *E. rubida*, Deane & Maiden, a White Gum, may be found.

During the last 10 miles no trees were seen of either *E. tereticornis*, *E. melliodora*, *E. Bridgesiana*, or *E. macrorrhyncha*, the altitude, which exceeds 4000 feet, being usually too great for them; and there is no better indicator of an extensive alteration in elevation than is afforded by the consequent change in the vegetation.

*Eucalyptus nova-anglica*, the Black or Red Peppermint of New England, occurs in fairly large quantities on the flats. Its bark is somewhat dark-coloured and in texture between fibrous and flaky. It has reminded me of *E. aggregata*, Deane & Maiden, in the field, partly from a resemblance in the bark and also because both species are found in similar situations, often near water-courses. The great difference in seedling and "sucker" foliage, however, not to mention other distinctive characters, sharply separates the two species. The "sucker" leaves of *E. nova-anglica* are cordate, acuminate or orbicular and glaucous, and are very striking when viewed with the mature lanceolate foliage. Although it has affinities with the Argyle Apple of the Goulburn district, which for so long has been recognised as *E. pulverulenta*,

Sims, I am disposed to regard it as a separate species. The difference in the texture of the bark of the two trees is one feature which causes hesitation before uniting them.

The formation around Guyra is chiefly basaltic, and it was noticed that trees of *E. viminalis* and *E. rubida* were much more difficult to separate than is the case in southern latitudes, where the two species often grow on Silurian slate areas. In the latter the foliage of *E. rubida* is very often glaucous, which usually affords a ready distinction in the forest. Whenever the seedling or "sucker" foliage is available, there is no difficulty in identification, the round leaves of *E. rubida* being very distinct from the narrow ones of *E. viminalis*. It was noticed around Guyra that the multi-flowered forms of both species were common, more so than is usually the case in the south. Near Ollera (45-mile post), trees of the latter were examined for a distance of about a quarter of a mile, and scarcely any were found with the flowers arranged in threes, which is generally the form in the Bathurst and Orange districts.

Among the various plants noted from the coach, and in some instances collected by the roadside, between the 20-mile post and Guyra were:—*Clematis glycinoides*, *Hibbertia linearis*, *Viola betonicaefolia*, *Discaria australis*, *Dodonæa viscosa*, *Daviesia corymbosa*, *Dillwynia juniperina*, Sieb. (between 27- and 28-mile posts), *Indigofera australis*, *Hardenbergia (Kennedy) monophylla*, *Acacia linifolia*, Willd. (between 27- and 28-mile posts), *A. obtusata* (?), *A. dealbata*, *A. leptoclada* (plentiful between 22- and 23-mile posts), *A. spectabilis*, *A. implexa*, *A. melanoxyton*, R.Br. (between 46- and 47-mile posts), *Angophora subvelutina*, *A. intermedia*, *Loranthus* sp., *Craspedia Richea*, *Wahlenbergia gracilis*, *Melichrus rotatus*, *Leucopogon lanceolatus*, R.Br. (near 42-mile post), *Persoonia* sp., *Hakea microcarpa*, *Pimelea glauca*, *Exocarpus cupressiformis*, *Callitris calcarata* (only between 20- and 21-mile posts), and *Diuris* sp.

The complete list of Eucalypts noticed between Narrabri, Moree and Warialda is as follows:—*E. populifolia*, *E. melanophloia*, *E. Woollsiana*, *E. tereticornis* var. *dealbata*, *E. crebra*, *E.*



*trachyphloia* (?), *E. rostrata*, *E. tessularis*, *E. largiflorens* (?), *E. melliodora*, and *E. hemiphloia* var. *albens* (?).

Between Inverell, Tingha and Guyra there were:—*E. viminalis*, *E. melliodora*, *E. tereticornis* and var. near *brevifolia*, *E. hemiphloia* var. *albens*, *E. Bridgesiana*, *E. macrorrhyncha*, *E. sideroxylon*, *E. eugenioides*, *E. Andrewsii*, *E. conica*, *E. coriacea*, *E. stellulata*, *E. nova-anglica*, and *E. rubida*.

The Acacias noted between Narrabri, Moree and Warialda were:—*A. harpophylla*, *A. homalophylla*, *A. pendula*, *A. Oswaldi*, *A. stenophylla* and *A. excelsa*.

Between Inverell, Tingha and Guyra there were:—*A. undulifolia*, *A. obtusata* (?), *A. viscidula*, *A. implexa*, *A. spectabilis*, *A. dealbata*, *A. leptoclada*, *A. linifolia* and *A. melanoxydon*.

I am indebted to Mr. J. H. Maiden, F.L.S., who has assisted me in identifying some of the plants.

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EXPLANATION OF PLATES XXII., XXIV., AND XXV.

Plate xxii.

*Casuarina Cunninghamiana*, Miq. (River Oak), Burragorang, Wollondilly River; Triassic and Permo-Carboniferous Cliffs in the background. (Vide p.695).

Plate xxiv.

*Callitris calcarata*, R.Br. (Black Pine), Tingha, N.S.W. (Vide p.783).

Plate xxv.

*Callitris robusta*, R.Br. (White Pine), Dubbo, N.S.W. (Vide p.783).

